

2. The Discharger shall report in the SMR the results for all monitoring specified in this MRP under sections III through IX. The Discharger shall submit monthly SMR's including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. SMR's are to include all new monitoring results obtained since the last SMR was submitted. If the Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR.
3. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

Table E-124. Monitoring Periods and Reporting Schedule

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period	SMR Due Date
Continuous	Permit effective date	Continuous	Submit with monthly SMR
1/Day	Permit effective date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	Submit with monthly SMR
1/Week	Permit effective date	Sunday through Saturday	Submit with monthly SMR
1/Month	Permit effective date	First day of calendar month through last day of calendar month	Submit with monthly SMR
1/Quarter	Permit effective date	1 January through 31 March 1 April through 30 June 1 July through 30 September 1 October through 31 December	Submit with quarterly SMR as follows: Q1 by 1 May Q2 by 1 August Q3 by 1 November Q4 by 1 February (of following year)
2/Year	Permit effective date	1 January through 30 June 1 July through 31 December	Submit with semiannual SMR as follows: S1 by 1 August S2 by 1 February (of the following year)
1/Year	Permit effective date	1 January through 31 December	Submit with annual SMR by 1 February (of following year)

4. **Reporting Protocols.** The Discharger shall report with each sample result the applicable Reporting Level (RL) and the current laboratory's Method Detection Limit (MDL), as determined by the procedure in 40 CFR Part 136.

The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

- a. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

- b. Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ. The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (\pm a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

- c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.
 - d. Dischargers are to instruct laboratories to establish calibration standards so that the Minimum Level (ML) value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.
5. **Multiple Sample Data.** When determining compliance with an AMEL, AWEL, or MDEL for priority pollutants and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of "Detected, but Not Quantified" (DNQ) or "Not Detected" (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure.
- a. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.
 - b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.
6. The Discharger shall submit SMR's in accordance with the following requirements:
- a. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with interim and/or final effluent limitations. The Discharger is not required to duplicate the submittal of data that is entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment.

- b. The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall clearly identify violations of the WDR's; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.
7. The Discharger shall submit in the SMR's calculations and reports in accordance with the following requirements:
- a. **Calendar Annual Average Limitations.** For constituents with effluent limitations specified as "calendar annual average" (aluminum, electrical conductivity, iron, and manganese) the Discharger shall report the calendar annual average in the December SMR. The annual average shall be calculated as the average of the samples gathered for the calendar year.
 - b. **Mass Loading Limitations.** For BOD₅, TSS, and ammonia, the Discharger shall calculate and report the mass loading (lbs/day) in the SMRs. The mass loading shall be calculated as follows:

$$\text{Mass Loading (lbs/day)} = \text{Flow (mgd)} \times \text{Concentration (mg/L)} \times 8.34$$

When calculating daily mass loading, the daily average flow and constituent concentration shall be used. For weekly average mass loading, the weekly average flow and constituent concentration shall be used. For monthly average mass loading, the monthly average flow and constituent concentration shall be used.

- c. **Removal Efficiency (BOD₅ and TSS).** The Discharger shall calculate and report the percent removal of BOD₅ and TSS in the SMRs. The percent removal shall be calculated as specified in section VII.A. of the Limitations and Discharge Requirements.
- d. **Total Coliform Organisms Effluent Limitations.** The Discharger shall calculate and report the 7-day median of total coliform organisms for the effluent. The 7-day median of total coliform organisms shall be calculated as specified in section VII.C. of the Limitations and Discharge Requirements.
- e. **Dissolved Oxygen Receiving Water Limitations.** The Discharger shall calculate and report monthly in the self-monitoring report: i) the dissolved oxygen concentration, ii) the percent of saturation in the main water mass, and iii) the 95th percentile dissolved oxygen concentration.
- f. **Turbidity Receiving Water Limitations.** The Discharger shall calculate and report the turbidity increase in the receiving water applicable to the natural turbidity condition specified in Section V.A.17.a-e. of the Limitations and Discharge Requirements.

- g. Temperature Receiving Water Limitations.** The Discharger shall calculate and report the temperature increase in the receiving water based on the difference in temperature at Monitoring Locations R-001 and R-002.
- 8.** The Discharger shall submit eSMRs in accordance with the following requirements:
- a.** When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment. The Discharger is not required to duplicate the submittal of data that is entered in a tabular format within CIWQS.
 - b.** The Discharger shall include a cover letter with the eSMR. The information contained in the cover letter shall clearly identify violations of the WDRs; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

C. Discharge Monitoring Reports (DMRs)

- 1.** At any time during the term of this permit, the State Water Board or Central Valley Water Board may notify the Discharger to electronically submit DMR's. Until such notification is given specifically for the submittal of DMR's, the Discharger shall submit DMR's in accordance with the requirements described below.
- 2.** DMR's must be signed and certified as required by the standard provisions (Attachment D). The Discharger shall submit the original DMR and one copy of the DMR to the address listed below:

STANDARD MAIL	FEDEX/UPS/ OTHER PRIVATE CARRIERS
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 I Street, 15 th Floor Sacramento, CA 95814

- 3.** All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1) or on self-generated forms that follow the exact same format of EPA Form 3320-1.

D. Other Reports

- 1. Special Study Reports and Progress Reports.** As specified in the compliance time schedules required in the Special Provisions contained in section VI of the Order, special study and progress reports shall be submitted in accordance with the following reporting requirements. At minimum, the progress reports shall include a discussion of the status of final compliance, whether the Discharger is on schedule

to meet the final compliance date, and the remaining tasks to meet the final compliance date.

Table E-132. Reporting Requirements for Special Provisions Reports

Special Provision	Reporting Requirements
Salinity Evaluation and Minimization Plan (Special Provision VI.C.3.a)	Within 9 months after adoption of this Order

2. The Discharger shall report the results of any special studies, acute and chronic toxicity testing, and TRE/TIE required by Special Provisions VI.C.2. The Discharger shall report the progress in satisfaction of compliance schedule dates specified in the Special Provisions VI.C.7. The Discharger shall submit reports with the first monthly SMR scheduled to be submitted on or immediately following the report due date in compliance with SMR reporting requirements described in subsection X.B.3 above.
3. Within 60 days of permit adoption, the Discharger shall submit a report outlining reporting levels (RLs), method detection limits, and analytical methods for approval. The Discharger shall comply with the monitoring and reporting requirements for CTR constituents as outlined in section 2.3 and 2.4 of the SIP. The maximum required reporting levels for priority pollutant constituents shall be based on the Minimum Levels (MLs) contained in Appendix 4 of the SIP, determined in accordance with Section 2.4.2 and Section 2.4.3 of the SIP. In accordance with Section 2.4.2 of the SIP, when there is more than one ML value for a given substance, the Central Valley Water Board shall include as RLs, in the permit, all ML values, and their associated analytical methods, listed in Appendix 4 that are below the calculated effluent limitation. The Discharger may select any one of those cited analytical methods for compliance determination. If no ML value is below the effluent limitation, then the Central Valley Water Board shall select as the RL, the lowest ML value, and its associated analytical method, listed in Appendix 4 for inclusion in the permit. Table E-10 (Attachment E) provides required maximum reporting levels in accordance with the SIP.
4. **Annual Operations Report.** By 1 February of each year, the Discharger shall submit a written report to the Executive Officer containing the following:
 - a. The names, certificate grades, and general responsibilities of all persons employed at the Facility.
 - b. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.
 - c. A statement certifying when the flow meter(s) and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration.
 - d. A statement certifying whether the current operation and maintenance manual, and contingency plan, reflect the wastewater treatment plant as currently

constructed and operated, and the dates when these documents were last revised and last reviewed for adequacy.

- e. The Discharger may also be requested to submit an annual report to the Central Valley Water Board with both tabular and graphical summaries of the monitoring data obtained during the previous year. Any such request shall be made in writing. The report shall discuss the compliance record. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with the waste discharge requirements.

ATTACHMENT F – FACT SHEET

Table of Contents

I.	Permit Information	F-3
II.	Facility Description	F-4
	A. Description of Wastewater and Biosolids Treatment or Controls	F-4
	B. Discharge Points and Receiving Waters.....	F-4
	C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data	F-5
	D. Compliance Summary	F-7
	E. Planned Changes	F-8
III.	Applicable Plans, Policies, and Regulations.....	F-9
	A. Legal Authorities	F-9
	B. California Environmental Quality Act (CEQA).....	F-9
	C. State and Federal Laws, Regulations, Policies, and Plans.....	F-9
	D. Impaired Water Bodies on CWA 303(d) List	F-12
	E. Other Plans, Policies and Regulations.....	F-13
IV.	Rationale For Effluent Limitations and Discharge Specifications.....	F-13
	A. Discharge Prohibitions	F-14
	B. Technology-Based Effluent Limitations.....	F-16
	1. Scope and Authority	F-16
	2. Applicable Technology-Based Effluent Limitations	F-16
	C. Water Quality-Based Effluent Limitations (WQBELs)	F-17
	1. Scope and Authority	F-17
	2. Applicable Beneficial Uses and Water Quality Criteria and Objectives.....	F-18
	3. Determining the Need for WQBELs	F-26
	4. WQBEL Calculations	F-50
	5. Whole Effluent Toxicity (WET).....	F-52
	D. Final Effluent Limitation Considerations.....	F-55
	1. Mass-based Effluent Limitations	F-55
	2. Averaging Periods for Effluent Limitations	F-55
	3. Satisfaction of Anti-Backsliding Requirements.....	F-56
	4. Antidegradation Policies	F-58
	5. Stringency of Requirements for Individual Pollutants.....	F-59
	E. Interim Effluent Limitations – Not Applicable.....	F-61
	F. Land Discharge Specifications.....	F-61
	G. Recycling Specifications	F-61
V.	Rationale for Receiving Water Limitations.....	F-62
	A. Surface Water.....	F-62
	B. Groundwater	F-64
VI.	Rationale for Provisions.....	F-65
	A. Standard Provisions.....	F-65
	B. Special Provisions	F-65
	1. Reopener Provisions	F-65
	2. Special Studies and Additional Monitoring Requirements	F-67
	3. Best Management Practices and Pollution Prevention	F-71

4. Construction, Operation, and Maintenance Specifications	F-71
5. Special Provisions for Municipal Facilities (POTWs Only)	F-72
6. Other Special Provisions.....	F-74
7. Compliance Schedules – Not Applicable	F-74
VII. Rationale for Monitoring and Reporting Requirements.....	F-74
A. Influent Monitoring	F-74
B. Effluent Monitoring	F-74
C. Whole Effluent Toxicity Testing Requirements	F-76
D. Receiving Water Monitoring.....	F-76
1. Surface Water.....	F-76
2. Groundwater – Not Applicable	F-77
E. Other Monitoring Requirements.....	F-77
VIII. Public Participation.....	F-78
A. Notification of Interested Parties.....	F-78
B. Written Comments	F-79
C. Public Hearing	F-79
D. Reconsideration of Waste Discharge Requirements	F-79
E. Information and Copying.....	F-80
F. Register of Interested Persons	F-80
G. Additional Information.....	F-80

List of Tables

Table F-1. Facility Information.....	F-3
Table F-2a. Historic Effluent Limitations and Monitoring Data for Monitoring Location EFF-001F-5	
Table F-2b. Historic Effluent Limitations and Monitoring Data for Monitoring Location EFF-002F-6	
Table F-3. Basin Plan Beneficial Uses	F-10
Table F-4. 303(d) List for the Sacramento River from Keswick Dam to.....	F-12
Cottonwood Creek.....	F-12
Table F-5. Summary of Technology-based Effluent Limitations	F-17
Table F-6. Copper ECA Evaluation	F-24
Table F-7. Lead ECA Evaluation.....	F-26
Table F-8. Summary of ECA Evaluations for CTR Hardness-dependent Metals.....	F-26
Table F-9. Salinity Water Quality Criteria/Objectives.....	F-31
Table F-10. Effluent Monitoring Data for Iron	F-35
Table F-11. Effluent Monitoring Data for Manganese.....	F-36
Table F-12. Water Quality Criteria/Objectives for Copper	F-41
Table F-13. Water Quality Criteria/Objectives for Zinc	F-49
Table F-14. Summary of Water Quality-Based Effluent Limitations.....	F-51
Table F-15. Whole Effluent Chronic Toxicity Testing Results.....	F-54
Table F-16. Summary of Final Effluent Limitations.....	F-60

ATTACHMENT F – FACT SHEET

As described in section I, the Central Valley Water Board incorporates this Fact Sheet as findings of the Central Valley Water Board supporting the issuance of this Order. This Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for Dischargers in California. Only those sections or subsections of this Order that are specifically identified as “not applicable” have been determined not to apply to this Discharger. Sections or subsections of this Order not specifically identified as “not applicable” are fully applicable to this Discharger.

VIII. PERMIT INFORMATION

The following table summarizes administrative information related to the Facility.

Table F-1. Facility Information

WDID	5A450105001
Discharger	City of Shasta Lake
Name of Facility	City of Shasta Lake Wastewater Treatment Facility
Facility Address	3700 Tibbits Road
	Shasta Lake, CA 96019
	Shasta County
Facility Contact, Title and Phone	Tom Chism, Wastewater Superintendent, (530) 275-7448
Authorized Person to Sign and Submit Reports	Tom Chism, Wastewater Superintendent, (530) 275-7448
Mailing Address	P.O. Box 777, Shasta Lake, CA 96019
Billing Address	Same as Mailing Address
Type of Facility	Publicly Owned Treatment Works (POTW)
Major or Minor Facility	Major
Threat to Water Quality	1
Complexity	A
Pretreatment Program	Not Applicable
Reclamation Requirements	Producer
Facility Permitted Flow	1.3 million gallons per day (MGD), average dry weather flow
Facility Design Flow	1.3 MGD
Watershed	Sacramento-Lower Cow-Lower Clear
Receiving Water	Churn Creek and unnamed tributary to Churn Creek
Receiving Water Type	Inland surface water

- A. The City of Shasta Lake (hereinafter Discharger) is the owner and operator of the City of Shasta Lake Wastewater Treatment Facility (hereinafter Facility), a POTW.

For the purposes of this Order, references to the “discharger” or “permittee” in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

- B. The Facility discharges wastewater to Churn Creek and an unnamed tributary of Churn Creek, waters of the United States, within the Sacramento-Lower Cow-Lower Clear Watershed. The Discharger was authorized to discharge pursuant to Order R5-2008-0037 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0079511 adopted on 14 March 2008 and expired on 1 March 2013. Attachment B provides a map of the area around the Facility. Attachment C provides a flow schematic of the Facility.

Prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater that results in a decrease of flow in any portion of a watercourse, the Discharger must file a petition with the State Water Board, Division of Water Rights, and receive approval for such a change. The State Water Board retains the jurisdictional authority to enforce such requirements under Water Code section 1211.

- C. The Discharger filed a report of waste discharge (ROWD) and submitted an application for reissuance of its WDR's and NPDES permit on 12 September 2012. The application was deemed complete on 1 October 2012. A site visit was conducted on 16 April 2013 to observe operations and collect additional data to develop permit limitations and requirements for waste discharge.

IX. FACILITY DESCRIPTION

The Discharger provides sewerage service for the community of Shasta Lake and serves a population of approximately 8,800. The design average dry weather flow capacity of the Facility is 1.3 MGD with a design peak wet weather flow of 5.2 MGD.

A. Description of Wastewater and Biosolids Treatment or Controls

The Facility provides advanced secondary treatment of wastewater. The treatment system consists of screening, oxidation, secondary clarification, cloth media filtration, ~~chlorination and dechlorination~~. ~~Conventional gas chlorination is used for disinfection followed by sulfur dioxide dechlorination and UV disinfection.~~ A 4 million gallon emergency retention basin is available for storage of excess influent flow or partially treated wastewater.

During the recreation season, 15 April to 15 October, all effluent is disposed of as reclaimed water on land by spray irrigation or discharged to the reclaimed water reservoir for other reclamation uses. The reclaimed water reservoir can store up to 420 acre-feet of reclaimed water.

Sludge processing consists of an aerobic digestion and sludge storage basins. The sludge storage basins provide storage for stabilized solids during the wet weather periods and serve as drying beds during the warm summer months. Dried sludge is hauled to a landfill for disposal.

B. Discharge Points and Receiving Waters

1. The Facility is located in Section 1, T32N, R4W, MDB&M, as shown in Attachment B, a part of this Order.

2. Treated municipal wastewater is discharged at Discharge Point 001 to Churn Creek, a water of the United States, at a point latitude 40° 39' 53" N and longitude 122° 22' 46" W.
3. Treated municipal wastewater may also be discharged at Discharge Point 002, an outfall from the reclaimed water reservoir into an unnamed tributary of Churn Creek, a water of the United States, at a point latitude 40° 39' 22" N and longitude 122° 22' 26" W.
4. Treated municipal wastewater may also be discharged to the reclaimed water reservoir, Monitoring Location PND-001 (at a point latitude 40° 39' 46" N and longitude 122° 23' 0" W), which provides reclaimed water to Knauf Fiber Glass, California Department of Transportation, and Sierra Pacific Industries, Shasta Lake Division.
5. Treated municipal wastewater may also be discharged to on-site Facility spray irrigation fields at Discharge Point 003, Monitoring Location LND-001.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

Effluent limitations contained in Order R5-2008-0037 for discharges from Discharge Points 001 and 002 (Monitoring Locations EFF-001 and EFF-002) and representative monitoring data from the term of Order R5-2008-0037 are as follows:

Table F-2a. Historic Effluent Limitations and Monitoring Data for Monitoring Location EFF-001

Parameter	Units	Effluent Limitation			Monitoring Data (From March 2008 To February 2013)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Flow	MGD	1.3 ¹	--	--	1.4	--	--
Conventional Pollutants							
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	30	6	7	7
	lbs/day ²	108	163	325	51	86	86
Total Suspended Solids	mg/L	10	15	30	1.8	5	5
	lbs/day ²	108	163	325	31	46	46
pH	standard units	--	--	6.0-9.0 ³	--	--	6.01-7.39
Priority Pollutants							
Chlorodibromomethane	µg/L	2.0	--	4.0	0.4 ⁴	--	0.4 ⁴
Copper, Total Recoverable	µg/L	25	--	46	8.0	--	8.0
Dichlorobromomethane	µg/L	3.7	--	7.3	3.6	--	3.6
Heptachlor Epoxide	µg/L	--	--	ND ⁵	--	--	0.005 ⁵
Lead, Total Recoverable	µg/L	5	--	10	0.3	--	0.3
Zinc, Total Recoverable	µg/L	42	--	81	30.4	--	30.4
Non-Conventional Pollutants							
Chlorine, Total Residual	mg/L	--	0.01 ⁶	0.02 ⁷	--	<0.01	<0.01
Nitrate Nitrogen, Total (as N)	mg/L	60	--	--	--	--	16

Parameter	Units	Effluent Limitation			Monitoring Data (From March 2008 To February 2013)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Turbidity	NTU	2 ⁸	5 ⁹	10 ¹⁰	1.3	3.6	3.6
Total Coliform Organisms	MPN/100 mL	2.2 ¹¹	23 ¹²	240 ⁵	2	2	2
Acute Toxicity	% Survival	--	--	70 ¹³ /90 ¹⁴	--	--	100

- ¹ Monthly average dry weather flow (June through September).
² Based on a design average dry weather flow of 1.3 MGD.
³ Applied as an instantaneous minimum and maximum at all times.
⁴ Concentration was detected but not quantified.
⁵ Applied as an instantaneous maximum effluent limitation.
⁶ Applied as a 4-day average effluent limitation.
⁷ Applied as a 1-hour average effluent limitation.
⁸ Applied as a daily average effluent limitation.
⁹ Not to be exceeded more than 5 percent of the time within a 24-hour period.
¹⁰ Not to be exceeded at any time.
¹¹ Applied as a 7-day median effluent limitation.
¹² Not to exceed more than once in any 30-day period.
¹³ Minimum for any one bioassay.
¹⁴ Median for any three consecutive bioassays.

Table F-2b. Historic Effluent Limitations and Monitoring Data for Monitoring Location EFF-002

Parameter	Units	Effluent Limitation			Monitoring Data (From March 2008 To February 2013)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Flow	MGD	1.3 ¹			1.7	--	6.67
Conventional Pollutants							
pH	standard units	--	--	6.0-9.0 ²	--	--	6.17-10.19
Priority Pollutants							
Chlorodibromomethane	µg/L	2.0	--	4.0	ND	--	ND
Copper, Total Recoverable	µg/L	25	--	46	8.5	--	8.5
Dichlorobromomethane	µg/L	3.7	--	7.3	0.8 ³	--	0.8 ³
Heptachlor Epoxide	µg/L	--	--	ND ⁴	0.005 ³	--	0.005 ³
Lead, Total Recoverable	µg/L	5	--	10	0.2 ³	--	0.2 ³
Zinc, Total Recoverable	µg/L	42	--	81	36.5	--	36.5
Non-Conventional Pollutants							
Chlorine, Total Residual	mg/L	--	0.01 ⁵	0.02 ⁶	--	ND	ND
Nitrate Nitrogen, Total (as N)	mg/L	60	--	--	7.3	--	7.3

Parameter	Units	Effluent Limitation			Monitoring Data (From March 2008 To February 2013)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Acute Toxicity	% Survival	--	--	707/90 ⁸	--	--	100

¹ Monthly average dry weather flow (June through September). Combined discharge flow limit from both Monitoring Locations EFF-001 and EFF-002.

² Applied as an instantaneous minimum and maximum at all times.

³ Concentration was detected but not quantified.

⁴ Applied as an instantaneous maximum effluent limitation.

⁵ Applied as a 4-day average effluent limitation.

⁶ Applied as a 1-hour average effluent limitation.

⁷ Minimum for any one bioassay.

⁸ Median for any three consecutive bioassays.

D. Compliance Summary

1. On 17 February 2011, a Staff Enforcement Letter (SEL) was issued to the Discharger notifying them of a complaint received on 31 January 2011 regarding the presence of foam in Churn Creek. Discharge Prohibition III.G of Order R5-2008-0037 prohibits the discharge from creating a nuisance, as defined in Section 13050 of the CWC.
2. The Central Valley Water Board issued a Notice of Violation (NOV) on 1 June 2011 regarding public complaints and observations during a compliance evaluation inspection conducted on 17 March 2011, regarding foam downstream of Discharge Point 001. The NOV states that the discharge of foam to Churn Creek is a violation of Discharge Prohibition III.G and Receiving Water Limitation V.A.6 (The discharge shall not cause floating material to be present in amounts that cause nuisance or adversely affect beneficial uses). The Discharger was required to submit a technical report that identified the source and cause of the foam and alternatives to eliminate the discharge of foam in the receiving water by 15 October 2011. On 5 July 2011, the Discharger provided an "Effluent Foam Technical Report" to identify the cause of foam and methods to eliminate foam in the effluent discharge.
3. On 6 February 2013, an SEL was issued to the Discharger notifying them that historical concerns with foam in the effluent will be considered during the permit renewal process.
4. The Central Valley Water Board issued a NOV on 8 April 2013 for violations of effluent limitations determined from the Discharger's self-monitoring reports for the months of February, March, and April 2012 for pH, total residual chlorine, and total coliform. In addition, the NOV addressed Discharge Specification violations determined from self-monitoring reports from June and October 2012 for the discharges into the reclaimed water reservoir at Monitoring Location PND-001 for total coliform organisms and turbidity.

E. Planned Changes

In Order R5-2008-0037, the Central Valley Water Board granted a dilution credit of 5:1 for parameters with water quality-based effluent limitations (WQBELs) based on aquatic life criteria and a dilution credit of 10:1 for parameters with WQBELs based on human health criteria. Dilution was granted based on an assumption of rapid and complete mixing due to the geometry and other aspects of the receiving stream and outfall. [The existing Discharge Prohibition that limited effluent discharge to surface water to periods when at least 10:1 (receiving water to effluent flow) ratio exists served as the basis for the dilution credit value]. Order R5-2008-0037 required the Discharger to conduct a mixing zone and dilution study and verify rapid and complete mixing and available dilution. As discussed further in section IV.C.2.c of this Fact Sheet, based on the results of the Discharger's mixing zone study, the Discharger has chosen not to pursue a mixing zone or dilution credits during this permit renewal due to unfavorable mixing zone conditions. Alternatively, the Discharger has pro-actively invested considerable effort and funds over the last 4 years to evaluate available discharge alternatives for the Facility, including potential Facility improvements to meet water quality criteria end-of-pipe. The Discharger has chosen to implement Facility improvements rather than further pursue dilution.

Facility improvements and operational changes are anticipated to address foam in the receiving water, which as discussed in section II.C of this Fact Sheet, and has historically been observed at Discharge Point 001 at levels that exceed permit requirements.

In a study dated 21 August 2009, titled *City of Shasta Lake, Effluent Discharge Study*, the Discharger states that, "*the City has come uncomfortably close to topping out the reservoir in the early winter months.*" The reasons provided for topping out the reclaimed water reservoir include lower than expected recycled water distribution and a reluctance to discharge to Churn Creek during the discharge period due to an uncertainty of meeting the 10:1 receiving water dilution requirement. The planned Facility upgrades are anticipated to allow the Discharger to meet water quality criteria end-of-pipe (applied as WQBELs), and potentially avoid future requirements for a 10:1 available dilution for discharge (i.e., pursue a continuous, year-round discharge to surface water operation).

Preliminary design, environmental permitting, funding procurement, and final design have already been completed for the planned Facility upgrades. Planned Facility upgrades include: new screened raw sewage pump station, aeration basins replacing oxidation ditch, additional clarifier, cloth filters replacing traveling bridge filters, ultraviolet (UV) disinfection replacing chlorine disinfection, additional equalization volume and a new sludge drying bed.

Construction of planned Facility upgrades are in progress, with construction scheduled through 2019. As of the date of adoption of this Order, the UV disinfection system and cloth filters have been installed and are operational, but the remaining upgrades to the Facility are not scheduled to be completed until late 2019.

~~Proposed upgrades to the Facility specified in the ROWD include:~~

- ~~• pH adjustment/alkalinity addition upstream of biological treatment to support full nitrification;~~

- ◆ Improved coagulation feed system, upstream of filtration;
- ◆ A new filtration technology (either deep-bed or microfiltration);
- ◆ Equalization of Title 22 effluent/tertiary treatment feed flows;
- ◆ Improved nitrogen removal, including:
 - Supplemental carbon source, and
 - Sludge age and hydraulic residence time supportive of year-round, full nitrification;
- ◆ Replacement of the gas chlorination system with either UV or ozone disinfection;
- ◆ Effluent cooling (if necessary)

The following is a summary of the anticipated timeline for the upgrade project:

<u>Project Milestone</u>	<u>Completion Timeframe</u>
Preliminary Design	2012 – completed
Environmental Permitting	2013-2014
Funding Procurement	2013-2015
Final Design of Improvements	2016
Construction	2017-2018
Construction Completion and Startup	2018

X. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the requirements and authorities described in this section.

F. Legal Authorities

This Order serves as WDR's pursuant to article 4, chapter 4, division 7 of the California Water Code (commencing with section 13260). This Order is also issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the USEPA and chapter 5.5, division 7 of the Water Code (commencing with section 13370). It shall serve as an NPDES permit for point source discharges from this facility to surface waters.

G. California Environmental Quality Act (CEQA)

Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of CEQA, (commencing with section 21100) of Division 13 of the Public Resources Code.

H. State and Federal Laws, Regulations, Policies, and Plans

1. Water Quality Control Plans. Requirements of this Order specifically implement the applicable Water Quality Control Plans.

- a. Basin Plan.** The Central Valley Water Board adopted a *Water Quality Control Plan, Fourth Edition (Revised October 2011), for the Sacramento and San Joaquin River Basins* (hereinafter Basin Plan) that designates beneficial uses, establishes water

quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. Requirements in this Order implement the Basin Plan.

The Basin Plan at II-2.00 states that the beneficial uses of any specifically identified water body generally apply to its tributary streams. The Basin Plan in Table II-1, Section II, does not specifically identify beneficial uses for Churn Creek or the unnamed tributary of Churn Creek, but does identify present and potential uses for the Sacramento River from Shasta Dam to the Colusa Basin Drain, to which Churn Creek and the unnamed tributary of Churn Creek, are tributary. In addition, the Basin Plan implements State Water Board Resolution 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Beneficial uses applicable to Churn Creek and the unnamed tributary of Churn Creek are as follows:

Table F-3. Basin Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
001/002	Churn Creek and Unnamed Tributary of Churn Creek	<u>Existing:</u> Municipal and domestic supply (MUN); agricultural supply, including irrigation and stock watering (AGR); industrial service supply (IND); hydropower generation (POW); water contact recreation, including canoeing and rafting (REC-1); non-contact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); migration of aquatic organisms, warm and cold (MIGR); spawning, reproduction, and/or early development, warm and cold (SPWN); wildlife habitat (WILD), and navigation (NAV).
--	Groundwater	<u>Existing:</u> Municipal and domestic supply (MUN); agricultural supply (AGR); industrial service supply (IND); and industrial process supply (PRO).

- 2. National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on 22 December 1992, and later amended it on 4 May 1995 and 9 November 1999. About forty criteria in the NTR applied in California. On 18 May 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on 13 February 2001. These rules contain federal water quality criteria for priority pollutants.
- 3. State Implementation Policy (SIP).** On 2 March 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on 28 April 2000, with respect to the priority pollutant criteria promulgated for California by the USEPA through the NTR and to the priority pollutant objectives established by the Central Valley Water Board in the Basin Plan. The SIP became effective on 18 May 2000, with respect to the priority pollutant criteria promulgated by the USEPA through the CTR. The State Water Board adopted amendments to the SIP on 24 February 2005, that became

effective on 13 July 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

4. **Antidegradation Policy.** Federal regulation 40 CFR 131.12 requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16. Resolution 68-16 is deemed to incorporate the federal antidegradation policy where the federal policy applies under federal law. Resolution 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Central Valley Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. The permitted discharge must be consistent with the antidegradation provision of 40 CFR 131.12 and State Water Board Resolution 68-16.
5. **Anti-Backsliding Requirements.** Sections 402(o) and 303(d)(4) of the CWA and federal regulations at 40 CFR 122.44(l) restrict backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. Compliance with the anti-backsliding requirements is discussed in the Fact Sheet (Attachment F, Section IV.D.3).
6. **Human Right to Water Act.** In compliance with Water Code section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This order promotes that policy by requiring discharges to meet maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use.
7. **Endangered Species Act Requirements.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code, §§ 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. §§ 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.
8. **Emergency Planning and Community Right to Know Act.** Section 13263.6(a) of the Water Code, requires that *"the Regional Water Board shall prescribe effluent limitations as part of the waste discharge requirements of a POTW for all substances that the most recent toxic chemical release data reported to the state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. Sec. 11023) (EPCRA) indicate as discharged into the POTW, for which the State Water Board or the Regional Water Board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective"*.

The most recent toxic chemical data report does not indicate any reportable off-site releases or discharges to the collection system for this Facility. Therefore, a reasonable potential analysis based on information from EPCRA cannot be conducted. Based on information from EPCRA, there is no reasonable potential to cause or contribute to an excursion above any numeric water quality objectives included within the Basin Plan or in any State Water Board plan, so no effluent limitations are included in this permit pursuant to Water Code section 13263.6(a).

However, as detailed elsewhere in this Order, available effluent data indicate that there are constituents present in the effluent that have a reasonable potential to cause or contribute to exceedances of water quality standards and require inclusion of effluent limitations based on federal and state laws and regulations.

- 9. Storm Water Requirements.** USEPA promulgated federal regulations for storm water on 16 November 1990 in 40 CFR Parts 122, 123, and 124. The NPDES Industrial Storm Water Program regulates storm water discharges from wastewater treatment facilities. Wastewater treatment plants are applicable industries under the storm water program and are obligated to comply with the federal regulations. The Discharger has submitted a Notice of Intent (NOI) and been approved for coverage under the State Water Board's Industrial Storm water General Order. Therefore, this Order does not regulate storm water.

I. Impaired Water Bodies on CWA 303(d) List

1. Under section 303(d) of the 1972 CWA, states, territories and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. On 11 October 2011 USEPA gave final approval to California's 2008-2010 section 303(d) List of Water Quality Limited Segments. The Basin Plan references this list of Water Quality Limited Segments (WQLSs), which are defined as "...those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR Part 130, et seq.)." The Basin Plan also states, "Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment." Churn Creek discharges to the Sacramento River between Keswick Dam and Cottonwood Creek. The Sacramento River, from Keswick Dam to Cottonwood Creek, is listed as a WQLS for unknown toxicity in the 2010 303(d) list of impaired water bodies.
2. **Total Maximum Daily Loads (TMDLs).** USEPA requires the Central Valley Water Board to develop TMDLs for each 303(d) listed pollutant and water body combination. Table 4, below, identifies the 303(d) listings and the status of each TMDL.

Table F-4. 303(d) List for the Sacramento River from Keswick Dam to Cottonwood Creek

Pollutant	Potential Sources	Proposed TMDL Completion
Chlorpyrifos and Diazinon	Agriculture	Approved 10 October 2007

Pollutant	Potential Sources	Proposed TMDL Completion
Toxicity	Unknown	2019

3. The 303(d) listings and TMDLs have been considered in the development of the Order. A pollutant-by-pollutant evaluation of each pollutant of concern is described in section IV.C.3. of this Fact Sheet.

J. Other Plans, Policies and Regulations

1. **Title 27.** The discharge authorized herein and the treatment and storage facilities associated with the discharge of treated municipal wastewater, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27, California Code of Regulations (CCR), section 20005 *et seq* (hereafter Title 27). The exemption, pursuant to Title 27 CCR section 20090(a), is based on the following:
 - a. The waste consists primarily of domestic sewage and treated effluent;
 - b. The waste discharge requirements are consistent with water quality objectives; and
 - c. The treatment and storage facilities described herein are associated with a municipal wastewater treatment plant.

XI. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the Code of Federal Regulations: 40 CFR section 122.44(a) requires that permits include applicable technology-based limitations and standards; and 40 CFR section 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water.

Effluent limitations and toxic and pretreatment effluent standards established pursuant to sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the CWA and amendments thereto are applicable to the discharge.

The CWA mandates the implementation of effluent limitations that are as stringent as necessary to meet water quality standards established pursuant to state or federal law [33 U.S.C., §1311(b)(1)(C); 40 CFR 122.44(d)(1)]. NPDES permits must incorporate discharge limits necessary to ensure that water quality standards are met. This requirement applies to narrative criteria as well as to criteria specifying maximum amounts of particular pollutants. Pursuant to federal regulations, 40 CFR 122.44(d)(1)(i), NPDES permits must contain limits that control all pollutants that *"are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality."* Federal regulations, 40 CFR 122.44(d)(1)(vi), further provide that *"[w]here a state has not established a water quality criterion for a specific chemical*

pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits."

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the Code of Federal Regulations: 40 CFR 122.44(a) requires that permits include applicable technology-based limitations and standards; and 40 CFR 122.44(d) requires that permits include WQBELs to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water where numeric water quality objectives have not been established. The Basin Plan at page IV-17.00, contains an implementation policy, "*Policy for Application of Water Quality Objectives*", that specifies that the Central Valley Water Board "*will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives.*" This Policy complies with 40 CFR 122.44(d)(1). With respect to narrative objectives, the Central Valley Water Board must establish effluent limitations using one or more of three specified sources, including: (1) USEPA's published water quality criteria, (2) a proposed state criterion (i.e., water quality objective) or an explicit state policy interpreting its narrative water quality criteria (i.e., the Central Valley Water Board's "*Policy for Application of Water Quality Objectives*") (40 CFR 122.44(d)(1)(vi)(A), (B) or (C)), or (3) an indicator parameter.

The Basin Plan includes numeric site-specific water quality objectives and narrative objectives for toxicity, chemical constituents, discoloration, radionuclides, and tastes and odors. The narrative toxicity objective states: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at III-8.00) The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The narrative chemical constituents objective states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At minimum, "*...water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs)*" in Title 22 of CCR. The Basin Plan further states that, to protect all beneficial uses, the Central Valley Water Board may apply limits more stringent than MCLs. The narrative tastes and odors objective states: "*Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.*"

K. Discharge Prohibitions

- 1. Prohibition III.A (No discharge or application of waste other than that described in this Order).** This prohibition is based on Water Code section 13260 that requires filing of a ROWD before discharges can occur. The Discharger submitted a ROWD for the discharges described in this Order; therefore, discharges not described in this Order are prohibited.

2. **Prohibition III.B (No bypasses or overflow of untreated wastewater, except under the conditions at CFR Part 122.41(m)(4)).** As stated in section I.G of Attachment D, Standard Provisions, this Order prohibits bypass from any portion of the treatment facility. Federal regulations, 40 CFR 122.41(m), define "bypass" as the intentional diversion of waste streams from any portion of a treatment facility. This section of the federal regulations, 40 CFR 122.41(m)(4), prohibits bypass unless it is unavoidable to prevent loss of life, personal injury, or severe property damage. In considering the Central Valley Water Board's prohibition of bypasses, the State Water Board adopted a precedential decision, Order No. WQO 2002-0015, which cites the federal regulations, 40 CFR 122.41(m), as allowing bypass only for essential maintenance to assure efficient operation.
3. **Prohibition III.C (No controllable condition shall create a nuisance).** This prohibition is based on Water Code section 13050 that requires water quality objectives established for the prevention of nuisance within a specific area. The Basin Plan prohibits conditions that create a nuisance.
4. **Prohibition III.D (No inclusion of pollutant free wastewater shall cause improper operation of the Facility's systems).** This prohibition is based on CFR Part 122.41 et seq. that requires the proper design and operation of treatment facilities.
5. **Prohibition III.E (No discharge of treated wastewater to Churn Creek, or its tributaries from 15 April to 15 October).** This prohibition has been in place since the discharge to surface water was originally permitted and exists to minimize degradation and maintain high quality water in the receiving water. The time frame (15 April to 15 October) has historically been referred to as the "recreation season," also, many times there is little to no flow in the receiving water during this time period.

This Order contains a reopener provision to consider removal or modification of this prohibition as a result of compliance with the tasks outlined in TSO R5-2014-0053 and submittal of proper documentation (i.e., anti-degradation analysis) justifying the increase in pollutant discharge during this time period, where historically the discharge to surface water has not been permitted.

6. **Prohibition III.F (No discharge of treated wastewater to Churn Creek, or its tributaries without 10:1 dilution).** This prohibition has been in place since the discharge to surface water was originally permitted and exists to minimize degradation and maintain high quality water in the receiving water. This prohibition is in place to prevent a discharge to surface water during periods of limited or no flow in the receiving water, as such conditions can exist during the discharge to surface water season (16 October to 14 April).

This Order contains a reopener provision to consider removal or modification of this prohibition as a result of compliance with the tasks outlined in TSO R5-2014-0053 and submittal of proper documentation (i.e., anti-degradation analysis) justifying the increase in pollutant discharge during these flow regimes where historically a discharge to surface water has not been permitted.

7. **Prohibition III.G (No discharge of treated wastewater from the spray fields into Churn Creek or its tributaries).** Consistent with Order R5-2008-0037, this Order prohibits discharges from the spray fields into Churn Creek and its tributaries.
8. **Prohibition III.H (No discharge of treated wastewater to the spray fields during precipitation and for at least 24-hours after cessation of precipitation).** Consistent with Order R5-2008-0037, this Order prohibits the discharge of treated wastewater to the spray fields during precipitation and for at least 24 hours after cessation of precipitation.

L. Technology-Based Effluent Limitations

1. Scope and Authority

Section 301(b) of the CWA and implementing USEPA permit regulations at 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR Part 133.

Regulations promulgated in 40 CFR 125.3(a)(1) require technology-based effluent limitations for municipal Dischargers to be placed in NPDES permits based on Secondary Treatment Standards or Equivalent to Secondary Treatment Standards.

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) established the minimum performance requirements for POTWs [defined in section 304(d)(1)]. Section 301(b)(1)(B) of that Act requires that such treatment works must, as a minimum, meet effluent limitations based on secondary treatment as defined by the USEPA Administrator.

Based on this statutory requirement, USEPA developed secondary treatment regulations, which are specified in 40 CFR Part 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of biochemical oxygen demand (BOD₅), total suspended solids (TSS), and pH.

2. Applicable Technology-Based Effluent Limitations

- a. **BOD₅ and TSS.** Federal regulations, 40 CFR Part 133, establish the minimum weekly and monthly average level of effluent quality attainable by secondary treatment for BOD₅ and TSS. This Order establishes WQBELs that are equal to or more stringent than the secondary technology-based treatment described in 40 CFR Part 133 and are necessary to protect the beneficial uses of the receiving stream. (See section IV.C.3.d of this Attachment for the discussion on WQBELs for BOD₅ and TSS.) In addition, 40 CFR 133.102, in describing the minimum level of effluent quality attainable by secondary treatment, states that the 30-day average percent removal shall not be less than 85 percent. This Order contains a limitation requiring an average of 85 percent removal of BOD₅ and TSS over each calendar month.

- b. **Flow.** The Facility was designed to provide advanced secondary level of treatment for up to an average dry weather design flow of 1.3 MGD. Therefore, this Order contains an average dry weather discharge flow effluent limit of 1.3 MGD.
- c. **pH.** The secondary treatment regulations at 40 CFR Part 133 also require that pH be maintained between 6.0 and 9.0 standard units.

**Summary of Technology-based Effluent Limitations
Discharge Points 001 and 002**

Table F-5. Summary of Technology-based Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow	MGD	1.3 ¹	--	--	--	--
Conventional Pollutants						
Biochemical Oxygen Demand (5-day @ 20°C) ²	mg/L	30	45	--	--	--
	lbs/day ³	325	487	--	--	--
	% Removal	85	--	--	--	--
pH ²	standard units	--	--	--	6.0	9.0
Total Suspended Solids ²	mg/L	30	45	--	--	--
	lbs/day ³	325	487	--	--	--
	% Removal	85	--	--	--	--

¹ Average dry weather design flow.

² Note that more stringent WQBELs for BOD₅, pH, and TSS are applicable and are established as final effluent limitations in this Order (see section IV.C.3.d of this Fact Sheet).

³ Based on an average dry weather flow of 1.3 MGD.

M. Water Quality-Based Effluent Limitations (WQBELs)

3. Scope and Authority

CWA Section 301(b) and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. This Order contains requirements, expressed as a technology equivalence requirement, more stringent than secondary treatment requirements that are necessary to meet applicable water quality standards. The rationale for these requirements, which consist of advanced-secondary treatment, is discussed in section IV.C.3 of this Fact Sheet.

40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative

objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or any applicable water quality criteria contained in the CTR and NTR.

4. Applicable Beneficial Uses and Water Quality Criteria and Objectives

The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, the Basin Plan implements State Water Board Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply.

The Basin Plan on page II-1.00 states: *"Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning..."* and with respect to disposal of wastewaters states that *"...disposal of wastewaters is [not] a prohibited use of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses."*

The federal CWA section 101(a)(2), states: *"it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water be achieved by July 1, 1983."* Federal Regulations, developed to implement the requirements of the CWA, create a rebuttable presumption that all waters be designated as fishable and swimmable. Federal Regulations, 40 CFR sections 131.2 and 131.10, require that all waters of the State regulated to protect the beneficial uses of public water supply, protection and propagation of fish, shell fish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation. Section 131.3(e), 40 CFR, defines existing beneficial uses as those uses actually attained after 28 November 1975, whether or not they are included in the water quality standards. Federal Regulation, 40 CFR section 131.10 requires that uses be obtained by implementing effluent limitations, requires that all downstream uses be protected and states that in no case shall a state adopt waste transport or waste assimilation as a beneficial use for any waters of the United States.

- a. Receiving Water and Beneficial Uses.** Refer to section III.C.1 above for a description of the receiving water and beneficial uses.

- b. **Effluent and Ambient Background Data.** The reasonable potential analysis (RPA), as described in section IV.C.3 of this Fact Sheet, was based on data from March 2008 through February 2013, which includes effluent data collected at Monitoring Locations EFF-001 and EFF-002 and ambient background data collected at Monitoring Location RSW-001 submitted in SMRs and the ROWD.
- c. **Assimilative Capacity/Mixing Zone.** Order R5-2008-0037 applied a dilution credit of 5:1 for parameters with WQBELs based on aquatic life criteria and a dilution credit of 10:1 for parameters with WQBELs based on human health criteria. Dilution was granted based on an assumption of rapid and complete mixing due to the geometry and other aspects of the receiving stream and outfall. [The existing Discharge Prohibition that limited effluent discharge to surface water to periods when at least 10:1 (receiving water to effluent flow) ratio exists served as the basis for the dilution credit value].

Order R5-2008-0037 required the Discharger to conduct a mixing zone and dilution study and verify rapid and complete mixing and available dilution. The Discharger submitted a report titled, City of Shasta Lake, Effluent Mixing Zone Study, dated 10 June 2010.

In the 10 June 2010 report, the Discharger determined that complete mixing was not obtained within two stream widths downstream of the discharge location as required by the SIP. As a result, the report indicated that incomplete mixing occurred with significantly less receiving water available for dilution throughout the reach of the mixing zone than anticipated. The Discharger acknowledged that a readjustment of dilution credits and corresponding revision of effluent limitations may be appropriate but further statistical analysis would be required in order to assess the ability to comply with new requirements.

Based on the results of the Discharger's mixing zone study, the Discharger has chosen not to pursue a mixing zone or dilution credits during this permit renewal. Therefore, based on the available information, the worst-case dilution is assumed to be zero to provide protection for the receiving water beneficial uses. The impact of assuming zero assimilative capacity within the receiving water is that discharge limitations are end-of-pipe limits with no allowance for dilution within the receiving water.

- d. **Conversion Factors.** The CTR contains aquatic life criteria for arsenic, cadmium, chromium III, chromium VI, copper, lead, nickel, silver, and zinc which are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. The default USEPA conversion factors contained in Appendix 3 of the SIP were used to convert the applicable dissolved criteria to total recoverable criteria.
- e. **Hardness-Dependent CTR Metals Criteria.** The *California Toxics Rule* and the *National Toxics Rule* contain water quality criteria for seven metals that vary as a function of hardness. The lower the hardness the lower the water quality criteria. The metals with hardness-dependent criteria include cadmium, copper, chromium III, lead, nickel, silver, and zinc.

This Order has established the criteria for hardness-dependent metals based on the reasonable worst-case ambient hardness as required by the SIP¹, the CTR² and State Water Board Order No. WQO 2008-0008 (City of Davis). The SIP and the CTR require the use of "receiving water" or "actual ambient" hardness, respectively, to determine effluent limitations for these metals. (SIP, § 1.2; 40 CFR § 131.38(c)(4)) The CTR does not define whether the term "ambient," as applied in the regulations, necessarily requires the consideration of upstream as opposed to downstream hardness conditions. Therefore, where reliable, representative data are available, the hardness value for calculating criteria can be the downstream receiving water hardness, after mixing with the effluent (Order WQO 2008-0008, p. 11). The Central Valley Water Board thus has considerable discretion in determining ambient hardness (Id., p.10).

As discussed below, scientific literature provides a reliable method for calculating protective hardness-dependent CTR criteria, considering all discharge conditions. This methodology produces hardness-dependent CTR criteria based on the reasonable worst-case downstream ambient hardness that ensure these metals do not cause receiving water toxicity under any downstream receiving water condition. Under this methodology, the Central Valley Water Board considers all hardness conditions that could occur in the ambient downstream receiving water after the effluent has mixed with the water body³. This ensures that effluent limitations are fully protective of aquatic life in all areas of the receiving water affected by the discharge under all flow conditions, at the fully mixed location, and throughout the water body including at the point of discharge into the water body.

- i. **Conducting the Reasonable Potential Analysis (RPA).** The SIP in Section 1.3 states, "*The RWQCB shall...determine whether a discharge may: (1) cause, (2) have a reasonable potential to cause, or (3) contribute to an excursion above any applicable priority pollutant criterion or objective.*" Section 1.3 provides a step-by-step procedure for conducting the RPA. The procedure requires the comparison of the maximum effluent concentration (MEC) and maximum ambient background concentration to the applicable criterion that has been properly adjusted for hardness. Unless otherwise noted, for the hardness-dependent CTR metals criteria the following procedures were followed for properly adjusting the criterion for hardness when conducting the RPA.

- (a) The SIP requires WQBELs if the MEC is equal to or exceeds the applicable criterion, adjusted for hardness. For comparing the MEC to the applicable criterion, the "fully mixed" reasonable worst-case downstream ambient hardness was used to adjust the criterion. In this evaluation the portion of the receiving

¹ The SIP does not address how to determine the hardness for application to the equations for the protection of aquatic life when using hardness-dependent metals criteria. It simply states, in Section 1.2, that the criteria shall be properly adjusted for hardness using the hardness of the receiving water.

² The CTR requires that, for waters with a hardness of 400 mg/L (as CaCO₃), or less, the actual ambient hardness of the surface water must be used. It further requires that the hardness values used must be consistent with the design discharge conditions for design flows and mixing zones.

³ All effluent discharges will change the ambient downstream metals concentration and hardness. It is not possible to change the metals concentration without also changing the hardness.

water affected by the discharge is analyzed. For hardness-dependent criteria, the hardness of the effluent has an impact on the determination of the applicable criterion in areas of the receiving water affected by the discharge. Therefore, for comparing the MEC to the applicable criterion, the reasonable worst-case downstream ambient hardness was used to adjust the criterion. For this situation it is necessary to consider the hardness of the effluent in determining the applicable hardness to adjust the criterion. The procedures for determining the applicable criterion after proper adjustment using the reasonable worst-case downstream ambient hardness is outlined in subsection ii, below.

- (b) The SIP requires WQBELs if the receiving water is impaired upstream (outside the influence) of the discharge, i.e., if the maximum ambient background concentration of a pollutant exceeds the applicable criterion, adjusted for hardness¹. For comparing the maximum ambient background concentration to the applicable criterion, the reasonable worst-case upstream ambient hardness was used to adjust the criteria. This is appropriate, because this area is outside the influence of the discharge. Since the discharge does not impact the upstream hardness, the effect of the effluent hardness was not included in this evaluation.

ii. Calculating Water Quality-Based Effluent Limitations. The remaining discussion in this section relates to the development of Water Quality-Based Effluent Limitations (WQBELs) when it has been determined that the discharge has reasonable potential to cause or contribute to an exceedance of the CTR hardness-dependent metals criteria in the receiving water.

A 2006 Study² developed procedures for calculating the effluent concentration allowance (ECA)³ for CTR hardness-dependent metals. The 2006 Study demonstrated that it is necessary to evaluate all discharge conditions (e.g., high and low flow conditions) and the hardness and metals concentrations of the effluent and receiving water when determining the appropriate ECA for these hardness-dependent metals. This method is superior to relying on downstream receiving water samples alone because it captures all possible mixed conditions in the receiving water. Both receiving water and effluent hardness vary based on flow and other factors, but the variability of receiving water and effluent hardness is sometimes independent. Using a calculated hardness value ensures that the Central Valley Water Board considers all possible mixed downstream values that may result from these two independent variables. Relying on receiving water sampling alone is less likely to capture all possible mixed downstream conditions.

¹ The pollutant must also be detected in the effluent.

² Emerick, R.W.; Borroum, Y.; & Pedri, J.E., 2006. California and National Toxics Rule Implementation and Development of Protective Hardness Based Metal Effluent Limitations. WEFTEC, Chicago, Ill.

³ The ECA is defined in Appendix 1 of the SIP (page Appendix 1-2). The ECA is used to calculate WQBELs in accordance with Section 1.4 of the SIP.

The equation describing the total recoverable regulatory criterion, as established in the CTR¹, is as follows:

$$\text{CTR Criterion} = \text{WER} \times (e^{m[\ln(H)]+b}) \quad (\text{Equation 1})$$

Where:

H = hardness (as CaCO₃)²

WER = water-effect ratio

m, b = metal- and criterion-specific constants

In accordance with the CTR, the default value for the WER is 1. A WER study must be conducted to use a value other than 1. The constants "m" and "b" are specific to both the metal under consideration, and the type of total recoverable criterion (i.e., acute or chronic). The metal-specific values for these constants are provided in the CTR at paragraph (b)(2), Table 1.

The equation for the ECA is defined in Section 1.4, Step 2, of the SIP and is as follows:

$$\text{ECA} = C \text{ (when } C \leq B)^3 \quad (\text{Equation 2})$$

Where:

C = the priority pollutant criterion/objective, adjusted for hardness (see Equation 1, above)

B = the ambient background concentration

The 2006 Study demonstrated that the relationship between hardness and the calculated criteria is the same for some metals, so the same procedure for calculating the ECA may be used for these metals. The same procedure can be used for chronic cadmium, chromium III, copper, nickel, and zinc. These metals are hereinafter referred to as "Concave Down Metals". "Concave Down" refers to the shape of the curve represented by the relationship between hardness and the CTR criteria in Equation 1. Another similar procedure can be used for determining the ECA for acute cadmium, lead, and acute silver, which are referred to hereafter as "Concave Up Metals".

ECA for Chronic Cadmium, Chromium III, Copper, Nickel, and Zinc – For Concave Down Metals (i.e., chronic cadmium, chromium III, copper, nickel, and zinc) the 2006 Study demonstrates that when the effluent is in compliance with the CTR criteria and the upstream receiving water is in compliance with the CTR criteria, any mixture of the effluent and receiving water will always be in compliance with the CTR

¹ 40 CFR § 131.38(b)(2).

² For this discussion, all hardness values are in mg/L as CaCO₃.

³ The 2006 Study assumes the ambient background metals concentration is equal to the CTR criterion (i.e., $C \leq B$)

criteria¹. The 2006 Study proves that regardless of whether the effluent hardness is lower or greater than the upstream hardness, the reasonable worst-case flow condition is the effluent dominated condition (i.e., no receiving water flow)². Consequently, for Concave Down Metals, the CTR criteria have been calculated using the downstream ambient hardness under this condition.

The effluent hardness ranged from 56 mg/L to 98 mg/L, based on 42 samples collected at Monitoring Locations EFF-001 and EFF-002. The upstream receiving water hardness varied from 45 mg/L to 114 mg/L, based on 14 samples collected at Monitoring Location RSW-001. Under the effluent dominated condition, the reasonable worst-case downstream ambient hardness is 56 mg/L. As demonstrated in the example shown in Table F-6, below, using this hardness to calculate the ECA for all Concave Down Metals will result in WQBELs that are protective under all flow conditions, from the effluent dominated condition to high flow condition. This example for copper assumes the following conservative conditions for the upstream receiving water:

- Upstream receiving water always at the lowest observed upstream receiving water hardness (i.e., 45 mg/L)
- Upstream receiving water copper concentration always at the CTR criteria (i.e., no assimilative capacity).

Using these reasonable worst-case receiving water conditions, a simple mass balance (as shown in Equation 3, below) accounts for all possible mixtures of effluent and receiving water under all flow conditions.

$$C_{MIX} = C_{RW} \times (1-EF) + C_{Eff} \times (EF) \quad \text{(Equation 3)}$$

Where:

C_{MIX} = Mixed concentration (e.g. metals or hardness)
 C_{RW} = Upstream receiving water concentration
 C_{Eff} = Effluent concentration
EF = Effluent Fraction

In this example, for copper, for any receiving water flow condition (high flow to low flow), the fully-mixed downstream ambient copper concentration is in compliance with the CTR criteria³.

¹ 2006 Study, p. 5700

² There are two typographical errors in the 2006 Study in the discussion of Concave Down Metals when the effluent hardness is less than the receiving water hardness. The effluent and receiving water hardness were transposed in the discussion, but the correct hardness values were used in the calculations. The typographical errors were confirmed by the author of the 2006 Study, by email dated 1 April 2011, from Dr. Robert Emerick to Mr. James Marshall, Central Valley Water Board.

³ This method considers the actual lowest observed upstream hardness and actual lowest observed effluent hardness to determine the reasonable worst-case ambient downstream hardness under all possible receiving water flow conditions.